

CLAIMS

What is claimed is:

- 1 1. A radio module for an electrical device, comprising:
2 a radio transceiver;
3 an antenna electrically coupled to the radio transceiver; and
4 a shield disposed relative to the antenna to isolate the antenna from loading effects of
5 components of the electrical device.
- 1 2. The radio module, as set forth in claim 1, wherein the radio module is adapted
2 to be secured to a side of the electrical device.
- 1 3. The radio module, as set forth in claim 1, comprising a printed circuit board,
2 wherein the antenna is disposed on the printed circuit board.
- 1 4. The radio module, as set forth in claim 3, wherein the shield comprises a metal
2 plate coupled to the printed circuit board.
- 1 5. The radio module, as set forth in claim 4, wherein the shield is disposed
2 relative to the transceiver to isolate the transceiver from electromagnetic interference from
3 electrical components within the electrical device.
- 1 6. The radio module, as set forth in claim 4, wherein the radio module further
2 comprises a cover disposed over the antenna and adapted to extend through an opening in the
3 side of the electrical device, the cover comprising a material that is generally transparent to
4 radio signals.

1 7. The radio module, as set forth in claim 1, wherein the shield comprises a
2 housing disposed around the antenna, the housing having a portion generally transparent to
3 radio signals from the antenna.

1 8. The radio module, as set forth in claim 7, wherein the housing is disposed
2 around the transceiver.

1 9. The radio module, as set forth in claim 7, wherein the housing comprises a
2 conductive metal.

1 10. The radio module, as set forth in claim 7, wherein the housing comprises a
2 polymeric material having a conductive coating.

1 11. The radio module, as set forth in claim 7, wherein the housing comprises a
2 periodic band-gap material.

1 12. A radio module, comprising:
2 a printed circuit board;
3 an antenna disposed on the printed circuit board; and
4 an electromagnetic shield extending from the printed circuit board around the antenna.

1 13. The radio module, as set forth in claim 12, comprising a radio transceiver
2 disposed on the printed circuit board and electrically coupled to the antenna.

1 14. The radio module, as set forth in claim 11, wherein the radio module is
2 adapted to be coupled to an enclosure and, wherein, the electromagnetic shield is adapted to
3 extend from the printed circuit board to the enclosure.

1 15. The radio module, as set forth in claim 14, wherein the shield comprises a
2 portion generally transparent to radio signals produced by the radio module, the portion being
3 disposed in facing relationship with the antenna.

1 16. The radio module, as set forth in claim 14, wherein the antenna is disposed
2 within the enclosure.

1 17. The radio module, as set forth in claim 16, wherein the radio module further
2 comprises a cover disposed over the antenna, the cover being generally transparent to radio
3 signals at the operating frequency of the radio module.

1 18. The radio module, as set forth in claim 12, wherein the shield comprises a
2 metal plate disposed on the printed circuit board.

1 19. The radio module, as set forth in claim 18, wherein the metal plate is disposed
2 on the side of the printed circuit board opposite the antenna.

1 20. A system, comprising:
2 a plurality of electrical devices; and
3 a plurality of radio modules disposed within the plurality of electrical devices to
4 enable the plurality of electrical devices to communicate wirelessly, wherein
5 each of the plurality of radio modules comprises an antenna adapted to provide

6 a maximum output at a defined load, and a member disposed relative to the
7 antenna to establish the defined load on the antenna independent of
8 components disposed within the electrical device in which the antenna is
9 disposed.

1 21. The system, as set forth in claim 20, wherein at least one member decouples
2 the antenna electromagnetically from the components within the electrical device in which
3 the antenna is disposed.

1 22. The system, as set forth in claim 20, wherein at least one member comprises a
2 conductive metal plate disposed between the antenna and the components within the
3 electrical device in which the antenna is disposed.

1 23. The system, as set forth in claim 20, wherein at least one radio module
2 comprises a radio transceiver coupled to the antenna.

1 24. The system, as set forth in claim 23, wherein at least one member is disposed
2 around the radio transceiver.

1 25. The system, as set forth in claim 23, wherein at least one of the plurality of
2 electrical devices comprises a processor coupled to the radio transceiver.

1 26. The system, as set forth in claim 20, wherein at least one antenna is
2 disposed on a printed circuit board securable to an enclosure.

1 27. A method of manufacturing a radio module for use within an electrical device,
2 comprising:
3 tuning an antenna to produce a maximum output at a defined load; and
4 disposing a shield relative to the antenna to establish the defined load on the antenna
5 independent of influences external to the antenna within the electrical device.

1 28. The method, as set forth in claim 27, wherein disposing a shield comprises
2 disposing an antenna housing around the perimeter of the antenna.

1 29. The method, as set forth in claim 27, wherein disposing a shield comprises
2 disposing the antenna on a printed circuit board and disposing a conductive plate on the
3 printed circuit board opposite the antenna.